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(54)【発明の名称】　磁気記録媒体用基板の製造方法

(57)【要約】

【課題】　ガラス基板と密着性の高いＮｉＰ無電解メッキ層を有する磁気記録媒体用基板を提供する。

【解決手段】　ガラス基板に、感受性化工程、活性化工程、ＮｉＰ無電解メッキ工程を順次設けてなる磁気記録媒体用基板の製造方法であって、ＮｉＰ無電解メッキ工程においてガラス基板を６０～７０℃の温度でメッキ処理を施した後、８０～９５℃でメッキ処理を行なうことを特徴とする磁気記録媒体用基板の製造方法

【特許請求の範囲】
【請求項１】　ガラス基板に、感受性化工程、活性化工程、ＮｉＰ無電解メッキ工程を順次設けてなる磁気記録媒体用基板の製造方法であって、ＮｉＰ無電解メッキ工程においてガラス基板を６０～７０℃の温度でメッキ処理を施した後、８０～９５℃でメッキ処理を行なうことを特徴とする磁気記録媒体用基板の製造方法
【請求項２】　ＮｉＰ無電解メッキ工程において、ガラス基板を６０～７０℃のＮｉＰメッキ浴に浸漬した後、８０～９５℃のＮｉＰメッキ浴に浸漬することを特徴とする請求項１記載の磁気記録媒体用基板の製造方法
【請求項３】　ＮｉＰ無電解メッキ工程において、ガラス基板を６０～７０℃のＮｉＰメッキ浴に浸漬した後、８０～９５℃まで昇温させながらメッキを施すことを特徴とする磁気記録媒体用基板の製造方法
【請求項４】　ガラス基板が、SiO_2-Li_2O系結晶化ガラスからなることを特徴とする請求項１または２記載の磁気記録媒体用基板
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、磁気記録媒体用基板の製造方法に関するものである。具体的には、情報産業等で利用される固定型の薄膜磁気記録ディスク等の高記録密度磁気記録媒体における基板の製造方法に関する。特には、ガラス基板と密着性の高いＮｉＰ無電解メッキ層を形成する方法に係わる。
【０００２】
【従来の技術】近年、コンピュータなどの情報処理装置の外部記憶装置として固定磁気ディスク装置が多く用いられている。この固定磁気ディスク装置に搭載される磁気ディスクは、一般に、アルミニウム合金からなる非磁性基板の表面に、ＮｉＰ無電解メッキ層を形成し、所要の平滑化処理、テクスチャリング処理などを施した後、その上に、非磁性金属下地層、磁性層、保護層、潤滑層などを順次形成して作製されている。
【０００３】磁気ディスク装置では、記録再生用ヘッドが磁気記録媒体上を一定の浮上量で移動しているが、近年、磁気記録媒体の面記録密度の急激な増加に伴って、この浮上量が極めて小さくなっている。また、磁気ディスク装置の小型化、軽量化も急速に進んでおり、これらに対応するためには、磁気記録媒体の表面の粗さをより一層小さくすることが必要であり、既に媒体表面粗さはＲａで数Å程度まで小さくなっている。さらに、可搬型の固定磁気ディスク装置に対応するために磁気ディスクに要求される耐衝撃性も４００Ｇ～８００Ｇと高い値となってきているため、耐衝撃性に対して従来のアルミニウム合金からなる基板では対応が難しくなっている。そこで、耐衝撃性、表面平滑性などの見地から、アルミニウム合金基板に代わって、極めて小さな表面粗さを達成することができ、かつ機械的強度にも優れているガラス基板が使用され始めている。
【０００４】ＮｉＰ無電解メッキを施したアルミニウム合金基板においては、多くの場合、その表面に研磨により基板円周方向に同心円状のテキスチャリングが施されている。これは、主に記録再生用のヘッドと磁気記録媒体との間の摩擦特性を良好ならしめ、耐久性を確保することを目的としている。また、近年では磁気ディスク装置作動時のヘッドの浮上量が著しく小さくなっていることに伴い、研磨によるテキスチャリングに代えて、ＣＳＳゾーンのみにレーザービームによるテキスチャリング、すなわちレーザービームにより突起を形成することが試みられている。（特開平８－１２９７４９号公報等）
【０００５】しかしながら、ＮｉＰ無電解メッキを施したアルミニウム合金基板とは異なり、ガラス板に直接レーザービームを照射して突起を形成することは、突起形状制御性が悪いため極めて困難である。そこで、レーザーテキスチャー技術をガラス基板に適用するためには、予め基板上にＮｉＰ無電解メッキ層を形成する必要がある。
【０００６】特開昭６１－５４０１８号公報等には、ガラス基板上にＮｉＰ無電解メッキ膜を形成する方法が提案されている。ところが、ガラス基板へ無電解メッキ法によりＮｉＰ層を密着性良く形成することは技術的に困難である。そこで、ガラス基板とＮｉＰ無電解メッキ膜の密着性を改善するために、メッキに用いるガラス基板表面を機械的または化学的に粗面化する方法や、無電解メッキの前処理を行う方法が提案されている。例えば、機械的な粗面化方法としては、Al_2O_3等の研磨剤を用いた砥石により表面粗さが中心線平均粗さＲａで１００Å以上研磨する方法が知られており、化学的な祖面化方法としては、アルカリ脱脂した後、フッ化水素酸等でエッチングする方法が知られている。
【０００７】また、無電解メッキの前処理を行う方法としては特開平７－２７２２６３号公報、特開平６－２１２４４０号公報等には、強化ガラス基板等を塩化第一スズの溶液で増感した後、塩化パラジウム溶液で活性化処理を行い、次いで、該ガラス基板を７０℃以上あるいは８０℃以上の高温下でＮｉＰ無電解メッキを行う方法が提案されている。
【０００８】
【発明が解決しようとする課題】しかしながら、これらの方法では、ガラス基板上に良好な磁気ディスクを得るに充分な密着性と平滑性を有するＮｉＰ層を無電解メッキ法で形成することができなかった。本発明は、上述の点に鑑みなされたものであり、その目的は、ガラス基板とＮｉＰ無電解メッキ層との密着性に優れ、高い耐衝撃性、表面平滑性を有し、しかも、ヘッドの低浮上高さが安定して得られる磁気記録媒体用基板の製造方法を提供することにある。

【０００９】
【課題を解決するための手段】本発明者らは、上記実情に鑑み鋭意検討した結果、ＮｉＰ無電解メッキ工程におけるＮｉＰメッキ浴の温度を制御することにより、上記の諸要件を満たす優れたＮｉＰ層が基板上に形成されることを見出し、本発明に達したものである。すなわち、本発明の要旨は、ガラス基板に、感受性化工程、活性化工程、ＮｉＰ無電解メッキ工程を順次設けてなる磁気記録媒体用基板の製造方法であって、ＮｉＰ無電解メッキ工程においてガラス基板を６０～７０℃の温度でメッキ処理を施した後、８０～９５℃でメッキ処理を行なうことを特徴とする磁気記録媒体用基板の製造方法に存する。
【００１０】以下、本発明を詳細に説明する。本発明のガラス基板としては、特に限定されないが、例えば、結晶化ガラスやアルミノシリケートガラスなどが好ましく使用される。中でも結晶化ガラスが好ましく、特には、SiO_2-Li_2O系結晶化ガラスが好適である。ガラス基板は、ＮｉＰ無電解メッキ層との密着性を確保するため、基板表面に微細な凹部を有するガラス基板を用いることが好適である。より具体的には、凹部の最大幅が、２０μｍ以下、更に好ましくは１０μｍ以下、特に好ましくは５μ以下の微細な凹部が好適に使用される。これは、板表面に微細な凹部を有する場合には、この微細な穴の中にＮｉＰ膜が形成されるため、物理的アンカー効果を高め、これによりガラス基板とＮｉＰメッキ層との密着を強固にするものと思われる。
【００１１】ガラス基板の表面の微細な凹部は、例えば、結晶化ガラス基板においては、フッ酸、フッ化カリウム、フッ化アンモニウム等のフッ酸系のエッチング剤を使用して、化学エッチング処理を行うことにより、形成することができる。これは、結晶化ガラスを用いると、化学エッチングを基板表面のアモルファス領域を選択的にエッチングできるため、表面の平滑性をある程度損なうことなく、適切に凹部を形成できるため好適である。凹部の大きさは、エッチング液の濃度、処理温度、処理時間などを適宜選択することにより制御することが可能である。また、高硬度アルミノシリケート基板においては、遊離砥粒や研削処理により加工することにより、凹部を形成することができる。
【００１２】本発明によれば、ガラス基板に、感受性化工程、活性化工程を行い、続いて特定の条件下でＮｉＰ無電解メッキを行うことによって、ガラス基板とＮｉＰ無電解メッキ層との密着性に優れた磁気記録媒体用基板を得ることができる。そして、通常は、感受性化工程の前には、脱脂工程が設けられる。また、各工程間には水洗工程が設けられ、洗浄水としては、イオン交換水または超純水が適宜使用される。
【００１３】脱脂工程は、ガラス基板の表面を洗浄する工程であり、例えば、超純水、アルカリ洗浄剤、酸洗浄剤、界面活性剤などを使用する方法が挙げられる。感受性化工程および活性化工程は、ガラス基板にＮｉＰ無電解メッキを開始させるために必要な触媒活性を与える工程である。すなわち、ガラス表面は触媒活性がないため、無電解メッキを開始するためには、ガラスの表面にＡｕ、Ｐｔ、Ｐｄ、Ａｇ等の貴金属の触媒核を形成することが必要である。
【００１４】上記の各工程は、公知の方法により、次のように実施される。（表面技術Ｖｏｌ．４４　Ｎｏ．１０、１９９３「ガラスと無電解ニッケルめっきの密着性」、堀田慎一他参照。）
感受性化工程において、まず、Ｓｎ、Ｔｉ、Ｐｄ、Ｈｇ等からなる２価の金属イオンを吸着させる。通常、０．０５ｇ／ｌ程度の塩化スズ水溶液が好適に使用され、常温で塩化スズ水溶液中に１～３分程度浸漬される。次に、活性化工程として、前記の触媒核となる貴金属を含む含む活性化処理溶液に上記のガラス基板を浸漬し、吸着した２価の金属イオンの還元作用により、ガラス基板の表面に触媒核を形成させる。通常、０．０５ｇ／ｌ程度の塩化パラジウム水溶液が好適に使用され、常温で塩化パラジウム水溶液中に１～３分程度浸漬させる。
【００１５】活性化工程で処理されたガラス基板は、６０～７０℃の温度でメッキ処理を施した後、８０～９５℃でメッキ処理を行なうことによってＮｉＰ無電解メッキされる。具体的な方法としては、ガラス基板を６０～７０℃のＮｉＰメッキ浴に浸漬した後、８０～９５℃のＮｉＰメッキ浴に浸漬する方法、あるいは、ガラス基板を６０～７０℃のＮｉＰメッキ浴に浸漬し、メッキ浴を８０～９５℃まで昇温させながらメッキを施す方法などが挙げられる。最初のＮｉＰメッキ浴の温度が、６０℃未満であるとメッキの製膜速度が遅く、また７０℃を越える高温であると感受性化処理時にガラス基板表面に吸着したＰｄが、メッキ浴に浸積した際にメッキ液と反応し、激しく水素が発生する。そのためこの水素が、ガラス基板とメッキ膜の間に入り込み、ＮｉＰメッキ膜の密着性を低下させる。
【００１６】すなわち、本発明者らの知見によれば、メッキ浴の温度と製膜速度には相関があり、低温で行う方が製膜速度が遅く、より強固な密着性を有するＮｉＰ膜ができる。しかし、製膜速度が遅いことにより、良好な磁気記録媒体に必要な膜厚までメッキを施すには、１０数時間から２０数時間と時間をかけなければならず、工業的生産するには問題である。そのため、７０℃以下の低温にて膜厚０．５～２μｍまでＮｉＰ膜の製膜を行い、密着性良好の膜を形成した後、良好な磁気記録媒体に必要な膜厚まで、８０～９５℃の高温で製膜を行うことが重要である。
【００１７】ＮｉＰ無電解メッキ浴は、通常、市販のものが使用される。ＮｉＰ無電解メッキ層の厚さは任意に選択されるが、良好な磁気記録媒体のためには、１～１

０μｍの範囲が良い。ガラス基板は６０～７０℃の低温メッキ浴中で１０～１２０分処理し、メッキを膜を０．１～２μｍ製膜し、さらに８０～９５℃の高温メッキ浴中で６０～１５０分処理し、メッキ膜を８～９．９μｍ製膜することが好適である。

【００１８】ＮｉＰ無電解メッキを施したガラス基板は、必要に応じて研磨処理を行ったり、レーザービームによるテキスチャリング、機械テキスチャリング等のテキスチャー処理を適宜行うことができ、更には、常法に従って下地層、磁性層、保護層及び潤滑層等が積層される。本発明によれば、上記のようなガラス基板にＮｉＰ無電解メツキを行うことにより、ガラス基板とＮｉＰ無電解メツキ膜との剥離等を引き起こさない充分な強さの密着性を有し、耐衝撃性に優れた磁気記録媒体を得ることが可能となる。

【００１９】

【実施例】以下、実施例により本発明を更に詳細に説明するが、本発明はその要旨を越えない限り、以下の実施例に限定されるものではない。

【００２０】実施例１

市販のSiO_2-Li_2O系の結晶化ガラスを使用し、固定砥粒による研削（グライディング）処理を行った後、研削剤（フジミインコーポレーティッド社製、商品名「人造研削剤Ｆ０（複合人造エメリー）」：比重３．９０以上：$Al_2O_3$４５重量％以上、ＴｉＯ２．０重量％以下、ＺｒＳｉＯ４９重量％以下：粒度区分＃１０００（最大粒子径２７μｍ以下））によりラッピング処理を行った。

【００２１】その後、ガラス用アルカリ洗剤（株式会社パーカーコーポレーション社製、商品名「ＰＫ－ＬＣＧ２２」）により浴温５０℃で１０分間、洗浄処理し、次いで水洗後、酸性フッ化アンモニウム（関東化学株式会社製、$NH_4F\cdot HF$、ＪＩＳ番号　Ｋ８８１７）５０ｇ／ｌ中に、室温で２分間、上記結晶化ガラスを浸漬してエッチング処理を行い、水洗を行った。得られたガラス基板表面の微細凹部の最大長は、３．９μｍであった。

【００２２】次に、このガラス基板を、市販の０．０５ｇ／ｌの$SnCl_2$水溶液に室温で２分間浸漬し、水洗を行い、感受性化処理を行った。その後、市販の０．０５ｇ／ｌの$PdCl_2$水溶液に室温で２分間浸漬し、水洗を行い活性化処理を行った。次いで、１次メッキとしてメッキ浴温７０℃のＮｉＰメッキ浴に１２０分浸漬しＮｉＰ無電解メッキを施し、膜厚２μｍのＮｉＰ層を成膜した。さらに、２次メッキとしてメッキ浴温８５℃のＮｉＰメッキ浴に１５０分浸漬しＮｉＰ無電解メッキにより膜厚１３μｍのＮｉＰ層を成膜した。更にメッキ後に密着性を向上させるため、１５０℃で１時間のベーキング処理を行った。

【００２３】このようにして得られたＮｉＰ層とガラス基板の密着性を評価した結果、評価点数が１０であり、良好な密着性を有することが確認された。なお、ガラス基板とＮｉＰ無電解メッキ層との密着性は、ＪＩＳＫ５４００８．１５の基盤目試験により密着性を評価した。評価点数１０は良好な密着性を有することを示す。

【００２４】実施例２～４

ＮｉＰ無電解メッキのメッキ浴温を表１に示した条件とした以外は実施例１と同様の方法で、ガラス基板にＮｉＰ無電解メッキ層を形成した。ガラス基板とＮｉＰ無電解メッキ層との密着性の評価点数はいずれも１０であり、良好な密着性を有する。

【００２５】比較例１

ＮｉＰ無電解メッキのメッキ浴温を９０℃とした以外は実施例１と同様の方法で、ガラス基板にＮｉＰ無電解メッキ層を形成した。密着性の評価点数は５であり、充分な密着性を得ることができなかった。

【００２６】

【表１】

	１次メッキ浴温度（℃）	２次メッキ浴温度（℃）	密着性（評価点数）
実施例１	７０	８５	１０
実施例２	６５	９０	１０
実施例３	６０	９０	１０
比較例１	９０	——	５

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : MITSUBISHI CHEMICAL CORP
(72)Inventor : SAIKI ATSUSHI
OKADA HIDEO

(54) PRODUCTION OF SUBSTRATE FOR MAGNETIC RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain a substrate having excellent adhesion between a glass substrate and a NiP electroless plating layer and having high shock resistance and surface smoothness, and to stably obtain low floating height of a head by plating a glass substrate in a first temp. range and then plating in a second temp. range.
SOLUTION: After a glass substrate is plated at 60 to 70° C, the substrate is further plated for NiP electroless plating at 80 to 95° C. The temp. of the plating bath shows correlation with the film forming rate, and when plating is carried out at low temp., a NiP film having strong adhesion is obtd. but the film forming rate is slow. Therefore, the film forming process of a NiP film is carried out to 0.5 to 2 μm thickness at low temp. as ≤70° C to form a film with good adhesion, and then, the forming process is continued to the required film thickness at high temp. as 80 to 95° C. Thereby, the obtd. magnetic recording medium exhibits enough adhesion which does not cause peeling between the glass substrate and the NiP electroless plating film, and the glass excellent in shock resistance.

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CLAIMS

[Claim(s)]
[Claim 1] A manufacture method of a substrate for magnetic-recording data medium which is the manufacture method of a substrate for magnetic-recording data medium of coming to prepare a susceptibility-ized production process, an activation production process, and a NiP electroless deposition production process in a glass substrate one by one, and is characterized by performing plating processing at 80-95 degrees C after performing plating processing for a glass substrate at temperature of 60-70 degrees C in a NiP electroless deposition production process [claim 2] A manufacture method of a substrate for magnetic-recording data medium according to claim 1 characterized by being immersed in a 80-95-degree C NiP plating bath in a NiP electroless deposition production process after a glass substrate is immersed in a 60-70-degree C NiP plating bath [claim 3] A manufacture method of a substrate for magnetic-recording data medium characterized by plating in a NiP electroless deposition production process, carrying out the temperature up of the glass substrate to 80-95 degrees C after being immersed in a 60-70-degree C NiP plating bath [claim 4] A substrate for magnetic-recording data medium according to claim 1 or 2 characterized by a glass substrate consisting of SiO2-Li2 O system glass ceramics

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[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention relates to the manufacture method of the substrate for magnetic-recording data medium. Specifically, it is related with the manufacture method of the substrate in high recording density magnetic-recording data medium, such as a thin film magnetic-recording disk of the cover half used by the information industry etc. It is involved in the method of forming the high NiP electroless deposition layer of a glass substrate and adhesion especially.
[0002]
[Description of the Prior Art] In recent years, many hard disk equipments are used as external storage of information processors, such as a computer. After the magnetic disk carried in this hard disk equipment generally forms a NiP electroless deposition layer in the surface of the nonmagnetic substrate which consists of an aluminium alloy and performs necessary data smoothing, texture ring processing, etc., on it, it carries out sequential formation of a non-magnetic metal substrate layer, a magnetic layer, a protective layer, the lubricating layer, etc., and is produced.
[0003] In the magnetic disk drive, although the arm head for record playback is moving by the fixed flying height in the magnetic-recording data-medium top, this flying height is very small in recent years with the rapid increment in the surface recording density of magnetic-recording data medium. Moreover, in order for the miniaturization of a magnetic disk drive and lightweight-ization to also progress quickly and to correspond to these, it is required to make still smaller granularity of the surface of magnetic-recording data medium, and data-medium surface roughness is already small to about several angstroms by Ra. Furthermore, since the shock resistance required of a magnetic disk since it corresponds to the hard disk equipment of a portable mold is also becoming 400G-800G, and a high value, in the substrate which consists of the conventional aluminium alloy to shock resistance, correspondence is difficult. Then, the glass substrate which can attain very small surface roughness and is excellent also in the mechanical strength instead of the aluminium alloy substrate from standpoints, such as shock resistance and surface smooth nature, is beginning to be used.
[0004] In many cases, in the aluminium alloy substrate which performed NiP electroless deposition, the concentric circle-like texture ring is given to the substrate circumferencial direction by polishing on the surface. If this is good, it mainly closes the friction property between the arm head for record playback, and magnetic-recording data medium, and it aims at securing endurance. Moreover, in recent years, to replace with the texture ring by polishing and to form a projection only in a CSS zone with the texture ring by the laser beam, i.e., a laser beam, in connection with the flying height of the arm head at the time of magnetic disk drive actuation being remarkably small, is tried. (JP,8-129749,A etc.)
[0005] However, since the projection configuration controllability is bad, it is very difficult unlike the aluminium alloy substrate which performed NiP electroless deposition, to irradiate a direct laser beam and to form a projection in a glass plate. So, in order to apply laser texture technology to a glass substrate, it is necessary to form a NiP electroless deposition layer on a substrate beforehand.
[0006] The method of forming a NiP electroless deposition film on a glass substrate is proposed by JP,61-54018,A. However, it is technically difficult to form a NiP layer in a glass substrate with sufficient adhesion by the electroless deposition method. Then, in order to improve the adhesion of a glass substrate and a NiP electroless deposition film, the method of split-face-izing the glass substrate surface used for plating mechanically or chemically and the method of performing pretreatment of electroless deposition are proposed. for example, -- as the mechanical split-face-ized method -- aluminum 2O3 etc. -- the method which 100A or more of surface roughness grinds by center line average-of-roughness-height Ra with the grinding stone using an abrasive material is learned, and as the chemical ****-ized method, after carrying out alkaline degreasing, the method of etching by a hydrofluoric acid etc. is learned.

[0007] Moreover, after carrying out sensitization of the tempered glass substrate etc. to JP,7-272263,A and JP,6-212440,A with the solution of a stannous chloride as a method of pretreating electroless deposition, a palladium-chloride solution performs activation and, subsequently the method of performing NiP electroless deposition under an elevated temperature (70 degrees C or more or 80 degrees C or more) is proposed in this glass substrate.
[0008]
[Problem(s) to be Solved by the Invention] However, by these methods, the NiP layer which has sufficient adhesion and smooth nature to obtain a good magnetic disk was not able to be formed by the electroless deposition method on the glass substrate. This invention is made in view of an above-mentioned point, and the purpose is excellent in the adhesion of a glass substrate and a NiP electroless deposition layer, and it has high shock resistance and surface smooth nature, and is in moreover offering the manufacture method of the substrate for magnetic-recording data medium that the low surfacing height of an arm head is obtained by being stabilized.
[0009]
[Means for Solving the Problem] this invention persons reach [that an outstanding NiP layer which satisfies many above-mentioned requirements is formed on a substrate, and] a header and this invention by controlling temperature of a NiP plating bath in a NiP electroless deposition production process, as a result of inquiring wholeheartedly in view of the above-mentioned actual condition. That is, a summary of this invention is the manufacture method of a substrate for magnetic-recording data medium of coming to prepare a susceptibility-ized production process, an activation production process, and a NiP electroless deposition production process in a glass substrate one by one, and after it performs plating processing for a glass substrate at temperature of 60-70 degrees C in a NiP electroless deposition production process, it consists in a manufacture method of a substrate for magnetic-recording data medium characterized by performing plating processing at 80-95 degrees C.
[0010] Hereafter, this invention is explained to details. Especially as a glass substrate of this invention, although not limited, glass ceramics, alumino silicate glass, etc. are used preferably, for example. Glass ceramics are desirable and SiO2-Li2 O system glass ceramics are suitable especially. It is suitable for a glass substrate to use for the substrate surface a glass substrate which has a detailed crevice in order to secure adhesion with a NiP electroless deposition layer. More specifically, 20 micrometers or less of 10 micrometers or less of detailed crevices 5micro or less are especially used for the maximum width of a crevice suitably preferably still more preferably. Since a NiP film is formed into this detailed hole when it has a detailed crevice on the board surface, this heightens a physical anchor effect and is considered to strengthen adhesion with a glass substrate and a NiP deposit by this.
[0011] A crevice where the surface of a glass substrate is detailed can be formed for example, in a glass-ceramics substrate by using an etching agent of fluoric acid systems, such as fluoric acid, a potassium fluoride, and ammonium fluoride, and performing chemical etching processing. Without spoiling surface smooth nature to some extent, since an amorphous field on the surface of a substrate can be alternatively etched for chemical etching if crystallization glass is used, since this can form a crevice appropriately, it is suitable. Magnitude of a crevice can be controlled by choosing suitably concentration of an etching reagent, processing temperature, the processing time, etc. Moreover, in a high degree-of-hardness aluminosilicate substrate, a crevice can be formed by processing it by loose grain or grinding processing.
[0012] According to this invention, a substrate for magnetic-recording data medium excellent in the adhesion of a glass substrate and a NiP electroless deposition layer can be obtained by performing a susceptibility-ized production process and an activation production process and performing NiP electroless deposition to a glass substrate under specific conditions continuously. And before a susceptibility-ized production process, a degreasing production process is usually established. Moreover, a rinsing production process is established between each production process, and ion exchange water or ultrapure water is suitably used as wash water.
[0013] A degreasing production process is a production process which washes the surface of a glass substrate, for example, a method of using ultrapure water, an alkali cleaner, an acid cleaning agent, a surfactant, etc. is mentioned. A susceptibility-ized production process and an activation production process are production processes which give catalytic activity required in order to make a glass substrate start NiP electroless deposition. That is, the glass surface needs to form a catalyst nucleus of noble metals, such as Au, Pt, Pd, and Ag, on the surface of glass, in order to start electroless deposition, since there is no catalytic activity.
[0014] Each above-mentioned production process is carried out as follows by well-known method. (Reference besides the adhesion of surface technical Vol.44 No.10, and 1993"glass and non-electrolyzed nickel plating", and Shin-ichi Hotta.)
A divalent metal ion which consists of Sn, Ti, Pd, Hg, etc. is made to adsorb first in a susceptibility-ized production process. Usually, a tin chloride aqueous solution of a 0.05 g/l degree is used suitably, and it is immersed about 1 to 3

minutes into a tin chloride aqueous solution in ordinary temperature. Next, a catalyst nucleus is made to form in an included activation solution containing noble metals which serve as the aforementioned catalyst nucleus as an activation production process on the surface of a glass substrate according to a reduction operation of a divalent metal ion which was immersed and adsorbed the above-mentioned glass substrate. Usually, a palladium-chloride aqueous solution of a 0.05 g/l degree is used suitably, and you make it immersed about 1 to 3 minutes into a palladium-chloride aqueous solution in ordinary temperature.

[0015] After performing plating processing at temperature of 60-70 degrees C, NiP electroless deposition of the glass substrate processed at an activation production process is carried out by performing plating processing at 80-95 degrees C. As a concrete method, after a glass substrate is immersed in a 60-70-degree C NiP plating bath, a method immersed in a 80-95-degree C NiP plating bath or a glass substrate is immersed in a 60-70-degree C NiP plating bath, and a method of plating, while carrying out the temperature up of the plating bath to 80-95 degrees C etc. is mentioned. Film production speed of plating by temperature of the first NiP plating bath being less than 60 degrees C is slow, and when Pd which stuck that it was an elevated temperature exceeding 70 degrees C to the glass substrate surface at the time of susceptibility-ized processing dips in a plating bath, it reacts with plating liquid, and hydrogen occurs violently. Therefore, this hydrogen enters between a glass substrate and a plating film, and reduces the adhesion of a NiP plating film.

[0016] That is, according to this invention persons' knowledge, temperature and film production speed of a plating bath have correlation, and a NiP film which film production speed is [to carry out at low temperature] slower, and has firmer adhesion is made. However, it is a problem, for must spend about twenty hours and time amount from about ten hours and carrying out industrial production according to film production speed being slow, in order to plate to thickness required for good magnetic-recording data medium. Therefore, after producing a NiP film to 0.5-2 micrometers of thickness at low temperature 70 degrees C or less and forming a film with good adhesion, it is important to produce a film at a 80-95-degree C elevated temperature to thickness required for good magnetic-recording data medium.

[0017] As for a NiP electroless deposition bath, a commercial thing is usually used. Although thickness of a NiP electroless deposition layer is chosen as arbitration, for good magnetic-recording data medium, the range of 1-10 micrometers is good. It is suitable to process a glass substrate in a 60-70-degree C low-temperature plating bath for 10 to 120 minutes, for 0.1-2 micrometers to produce a film, to process plating for a film for 60 to 150 minutes in a further 80-95-degree C elevated-temperature plating bath, and to produce 8-9.9 micrometers of plating films.

[0018] If needed, polishing processing can be performed, or a glass substrate which performed NiP electroless deposition can perform suitably texture processing of a texture ring by laser beam, a machine texture ring, etc., and the laminating of a substrate layer, a magnetic layer, a protective layer, the lubricating layer, etc. is further carried out according to a conventional method. According to this invention, by performing NiP electroless deposition to the above glass substrates, it has the adhesion of sufficient strength which does not cause exfoliation with a glass substrate and a NiP electroless deposition film etc., and it becomes possible to obtain magnetic-recording data medium excellent in shock resistance.

[0019]

[Example] Hereafter, although an example explains this invention to details further, this invention is not limited to the following examples, unless the summary is exceeded.

[0020] After using the crystallization glass of the SiO2-Li2 O system of example 1 marketing and performing grinding (gliding) processing by bonded abrasive, abrasives (the product made from FUJIMIINKOPORE, more than more than trade name "artificial abrasives F0 (compound artificial emery)":specific gravity 3.90:aluminum203 45 % of the weight, 2.0 or less % of the weight of TiO(s), less than [ZrSiO49 % of the weight]:grain-size partition #1000 (27 micrometers or less of diameters of grain of maximum size)) performed wrapping processing.

[0021] Then, washing processing was carried out for 10 minutes at 50 degrees C of bath temperature with the alkali detergent for glass (the Parker, Inc. make, trade name "PK-LCG22"), and it rinsed by immersing for 2 minutes and the above-mentioned crystallization glass at a room temperature, and subsequently after rinsing and to the inside of 50g [/l.] acid ammonium fluoride (the Kanto chemistry incorporated company make, NH4 F-HF, JIS number K8817), performing etching processing. The maximum length of the detailed crevice on the obtained surface of a glass substrate was 3.9 micrometers.

[0022] Next, it is this glass substrate SnCl2 of commercial 0.05 g/l It rinsed by having been immersed in the aqueous solution for 2 minutes at the room temperature, and susceptibility-ized processing was performed. Then, PdCl2 of commercial 0.05 g/l It rinsed by having been immersed in the aqueous solution for 2 minutes at the room temperature, and activation was performed. Subsequently, it was immersed in the NiP plating bath of 70 degrees C of plating bath

temperature as primary plating for 120 minutes, NiP electroless deposition was performed, and the NiP layer of 2 micrometers of thickness was formed. Furthermore, it was immersed in the NiP plating bath of 85 degrees C of plating bath temperature as secondary plating for 150 minutes, and the NiP layer of 13 micrometers of thickness was formed by NiP electroless deposition. Furthermore, in order to raise adhesion after plating, baking processing of 1 hour was performed at 150 degrees C.

[0023] Thus, as a result of evaluating the adhesion of the obtained NiP layer and a glass substrate, evaluation mark are 10 and having good adhesion was checked. In addition, the adhesion of a glass substrate and a NiP electroless deposition layer evaluated adhesion by the cross cut adhesion test of JISK 54008.15. It is shown that the evaluation mark 10 have good adhesion.

[0024] Except having considered as the conditions which showed the plating bath temperature of an example 2 - 4NiP electroless deposition in a table 1, it is the same method as an example 1, and the NiP electroless deposition layer was formed in the glass substrate. Each evaluation mark of the adhesion of a glass substrate and a NiP electroless deposition layer are 10, and have good adhesion.

[0025] Except having made plating bath temperature of example of comparison 1NiP electroless deposition into 90 degrees C, it is the same method as an example 1, and the NiP electroless deposition layer was formed in the glass substrate. The evaluation mark of adhesion are 5 and were not able to acquire sufficient adhesion.

[0026]

[A table 1]

------------------------------ Whenever [primary plating bath temperature] Whenever [secondary plating bath temperature] Adhesion (degree C) (degree C) (evaluation mark)
------------------------------ The example 1 70 85 10 Example 2 65 90 10 Example 3 60 90 10 Example 1 of a comparison 90 -- 5 ------------------------------

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[Translation done.]